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parisons of the field with the North Polar Standards. Exposures on Seed 27 and Cramer Isochromatic plates (the latter behind a yellow filter) were made with the 60-inch reflector of the Solar Observatory in the usual manner. Measures of two pairs of photographs exposed on different nights gave the first of the following series of results:

	Polar Comparisons	Adopted
Photographic Mag.	11.67	11.43
Photovisual Mag.	9.67	9.67
Color Index	+2.00	+1.76

The color index was also derived by the method of exposure ratios. Four isochromatic plates were exposed as follows (two nights):

With yellow filter	16, 32 ^s	(Yellow images)
Without filter	2, 4, 8, 16 ^s	(Blue images)
With yellow filter	16, 32 ^s	(Yellow images)

From the images on these plates it was found that the ratio of exposure times producing blue and yellow images of the same size is 0.434, which, for the emulsion used, corresponds to a color index of 1.76 ± 0.03 (P. E.) mags. This agrees well with the spectrum, which is Mb, and is much more reliable than the value given above, as the photographic magnitudes obtained from the polar comparison plates are discordant and uncertain. Since the photovisual magnitudes are probably reliable, the adopted photographic magnitude is that obtained by combining the mean photovisual magnitude with the color index.

The following are approximate results for the neighboring bright star B. D. $+4^{\circ}3560$ (8^m.7):

Photographic Mag.	9.1
Photovisual Mag.	8.9
Color Index	+0.2

FREDERICK H. SEARES.

THE PHOTOGRAPHIC MAGNITUDE OF THE NINTH SATELLITE OF JUPITER.

The brightness of the Ninth Satellite of *Jupiter* has been determined by direct estimates of images on two photographs made with the 60-inch reflector. Both plates have equally-timed exposures on the Polar Standards and on the satellite

field. The data relative to the plates and the magnitudes obtained from them (corrected for atmospheric extinction) are as follows:

Plate	Date	Length of Exposures	No. Comp. Stars	Pg. Mag.
3484	1916, Oct. 18	32 ^m	7	18.29
3487	Oct. 19	32	7	18.32

The adopted photographic magnitude, 18.3, applies to a time five days before the present opposition. Reducing to the mean opposition we obtain magnitude 18.6. On the basis of this determination the photographic magnitudes of the seventh and eighth satellites are between 17.5 and 18.0.

The size of the Ninth Satellite is readily computed once we know the albedo. Estimating the color-index at one magnitude and assuming a value of the visual albedo similar to that of the Moon, *Pallas*, and *Ceres* ($p = 0.1$ in Russell's formulæ, *Astrophysical Journal*, **43**, 177, 1916) we find that the angular diameter at mean opposition is $0''.009$. If we assume a higher reflecting power, for instance $p = 0.25$, a value near that of *Juno*, the diameter is $0''.006$. The comparison of this satellite with the asteroids is obviously better than assuming for it a close similarity in reflecting power to the four largest satellites of *Jupiter* for which the mean value of p is 0.35.

The linear diameter of the Ninth Satellite at mean opposition is 17.4 miles on the first assumption above, and on the second is 11.2 miles. The true value is probably within these limits.

SETH B. NICHOLSON.

HARLOW SHAPLEY.

A NEW VARIABLE STAR.

In the course of the investigation of star colors in the southern globular cluster Messier 9 (N. G. C. 6333) several objects have been found for which the light apparently varies thru small intervals. One star, however, whose position with respect to the center of the cluster is

$$\Delta\alpha = 7^s.4 \quad \Delta\delta = -1' 18''$$

shows a conspicuous short-period variation. It is brighter than normal on plates made April 26 and June 4, 1916, and of intermediate brightness or faint on March 29, April 27,